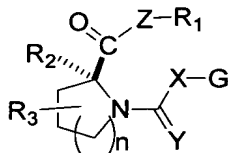


WHAT IS CLAIMED IS:

1. A compound of the formula I

**I**

wherein

- 10 R_1 is selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl and CH_2OR_4 ;

- 15 R_2 is selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heterocyclo or substituted heterocyclo, heteroaryl or substituted heteroaryl and CH_2OR_4 ;

R_3 is selected from the group consisting of hydrogen, alkyl or substituted alkyl, CH_2OR_4 , OR_2 , SR_2 , halo, NHR_2 , $NHCOR_4$, $NHCO_2R_4$, $NHCONR_4R_4'$ and $NHSO_2R_4$;

- 20 R_4 and R_4' for each occurrence are each independently selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heterocyclo or substituted heterocyclo and heteroaryl or substituted heteroaryl;

- 25 G is a mono- or polycyclic ring system selected from the group consisting of aryl, heterocyclo and heteroaryl, wherein said ring system may optionally substituted with one or more substituents selected from the group consisting of hydrogen, halo, CN, CF_3 , OR_4 , CO_2R_4 , NR_4R_4' , $CONR_4R_4'$, CH_2OR_4 , SR_4 , SOR_4 , SO_2R_4 , NO_2 , alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl,

cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

X is a linking group selected from the group consisting of NR_4 and CHR_4 ;

Y is selected from the group consisting of O, NR_4 , NOR_4 , S and CH;

5 Z is -O- or NR_4 ; and

n is an integer of 1 or 2;

including all prodrug esters, pharmaceutically acceptable salts and stereoisomers thereof,

with the following provisos:

10 (a) when Y is NOR_4 , R_4 is not hydrogen;

(b) excluding compounds where the following occur simultaneously:

R_1 is methyl;

X is NH;

Y is O or S; and

15 Z is O;

(c) excluding compounds where the following occur simultaneously:

R_1 is methyl;

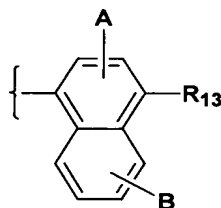
X is NH;

Z is O;

20 Y is NR_4 ;

R_4 is selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl; and

25 G has the following structure:



wherein

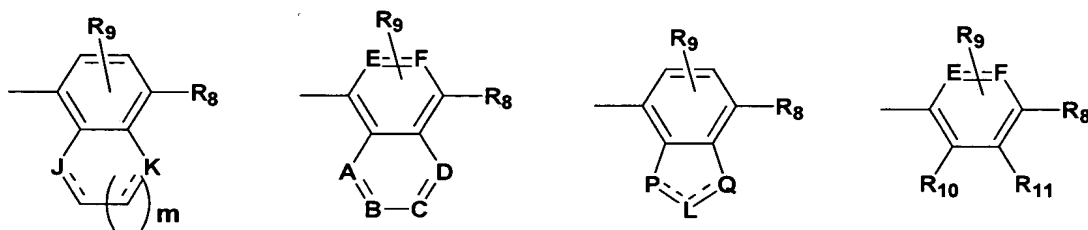
R_{13} is selected from the group consisting of hydrogen, cyano (-CN), nitro (-NO₂), halo, heterocyclo, OR₁₄, CO₂R₁₅, CONHR₁₅, COR₁₅, S(O)_pR₁₅, SO₂NR₁₅R₁₅', NHCOR₁₅ and NHSO₂R₁₅;

R_{14} in each functional group is independently selected from the group consisting of hydrogen, alkyl or substituted alkyl, CHF₂, CF₃ and COR₁₅;

R_{15} and R_{15}' in each functional group are each independently selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, heterocycloalkyl or substituted heterocycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heteroaryl or substituted heteroaryl and -CN;

A and B are each independently selected from the group consisting of hydrogen, halo, cyano(-CN), nitro(-NO₂), alkyl or substituted alkyl and OR₁₄; and p is an integer from 0 to 2.

2. The compound as defined in claim 1 wherein G is selected from:



wherein

R_8 , R_9 , R_{10} and R_{11} are each independently selected from the group consisting of hydrogen (H), NO₂, CN, CF₃, OR₄, CO₂R₄, NR₄R₄', CONR₄R₄', CH₂OR₄, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

A to F is each independently selected from N or CR₁;

J, K, L, P and Q are each independently selected from NR₁₂, O, S, SO, SO₂ or CR₁₂R₁₂';

R_{12} and R_{12}' in each functional group are each independently selected from a bond or R₁; and

m is an integer of 0 or 1.

3. The compound as defined in claim 2 wherein R₈ is CN.

5 4. The compound as defined in claim 1 wherein

R₁ is hydrogen or alkyl;

R₂ is hydrogen or alkyl;

R₃ is hydroxyl;

X is NR₄;

10 Y is O;

Z is O; and

n is 1

15 5. A pharmaceutical composition comprising the compound as defined in claim 1 and a pharmaceutically acceptable carrier therefore.

6. The pharmaceutical composition as defined in claim 5 further comprising a growth promoting agent.

20 7. A pharmaceutical composition comprising a compound as defined in claim 1 and at least one additional therapeutic agent selected from the group consisting of parathyroid hormone, bisphosphonates, estrogen, testosterone, progesterone, selective estrogen receptor modulators, growth hormone secretagogues, growth hormone, progesterone receptor modulators, anti-diabetic agents, anti-
25 hypertensive agents, anti-inflammatory agents, anti-osteoporosis agents, anti-obesity agents, cardiac glycosides, cholesterol lowering agents, anti-depressants, anti-anxiety agents, anabolic agents, and thyroid mimetics.

30 8. A method for treating or delaying the progression or onset of muscular atrophy, lipodistrophy, long-term critical illness, sarcopenia, frailty or age-related functional decline, reduced muscle strength and function, reduced bone density or growth, the catabolic side effects of glucocorticoids, chronic fatigue syndrome, bone

fracture repair, acute fatigue syndrome and muscle loss following elective surgery, cachexia, chronic catabolic state, eating disorders, side effects of chemotherapy, wasting, depression, nervousness, irritability, stress, growth retardation, reduced cognitive function, male contraception, hypogonadism, Syndrome X, diabetic complications or obesity, which comprises administering to a mammalian species in need of treatment a therapeutically effective amount of a compound as defined in claim 1.

9. A method according to claim 8 further comprising administering, concurrently or sequentially, a therapeutically effective amount of at least one additional therapeutic agent selected from the group consisting of other compounds of formula I, parathyroid hormone, bisphosphonates, estrogen, testosterone, progesterone, selective estrogen receptor modulators, growth hormone secretagogues, growth hormone, progesterone receptor modulators, anti-diabetic agents, anti-hypertensive agents, anti-inflammatory agents, anti-osteoporosis agents, anti-obesity agents, cardiac glycosides, cholesterol lowering agents, anti-depressants, anti-anxiety agents, anabolic agents and thyroid mimetics.